

REMARKS

Claims 1-14 are all the claims pending in the application.

I. The Rejection Under 35 U.S.C. §112

Claims 1-14 are rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite. In particular, the Examiner states that the use of parentheses in the claims makes the claim indefinite.

Applicants respectfully traverse the Examiner's rejection. Contrary to the Examiner's position, Applicants respectfully submit that Applicants use of parentheticals does not render Applicants' claims indefinite. Parenthesis are a type of punctuation commonly used in the English language and it is respectfully submitted Applicants use of parenthesis is clear and definite and in a manner that would be clearly understood by one of ordinary skill in the art. Therefore, the parenthesis used to define Applicants' substituent groups have not been removed.

Applicants' claims 1-6 and 9-11 have been amended in other areas for clarity and to remove redundant language.

For the above reasons, it is respectfully submitted that Applicants' claims are clear and definite and it is requested that the rejection under 35 U.S.C. §112 be reconsidered and withdrawn.

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II. Paragraph No. 2-3 - The Rejections Under 35 U.S.C. §103(a)

Claims 9-13 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Goodall (U.S. patent no. 6,136,499) in view of Allen (U.S. patent no. 6,165,678).

Claims 4-8 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Goodall in view of Allen and Aoi.

While, it is believed the Examiner has not established a prima facie case of obviousness, to advance the prosecution of the case, Applicants have provided additional declaration evidence showing the improved properties of the presently claimed positive photoresist compositions for far ultraviolet exposure over the compositions of the references of the rejection.

As shown in the enclosed unexecuted Declaration Under 37 C.F.R. §1.132, by the use of the composition as claimed by Applicants, a positive photoresist compositions for far ultraviolet exposure can be made that is unexpectedly superior in preventing the occurrence of development defects and unexpectedly superior in defocus latitude depended on line pitch. Further, Applicants' claimed positive photoresist compositions for far ultraviolet exposure are unexpectedly improved in storage stability (particle number after storage).

For the above reasons, it is respectfully submitted that the subject matter of claims 9-13 is neither taught by nor made obvious from the disclosures of Goodall in view of Allen and that the subject matter of claims 4-8 is neither taught by nor

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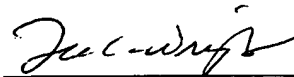
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made obvious from the disclosures of Goodall in view of Allen and Aoi and it is requested that the rejections under 35 U.S.C. §103(a) be reconsidered and withdrawn.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Applicant hereby petitions for any extension of time which may be required to maintain the pendency of this case, and any required fee, except for the Issue Fee, for such extension is to be charged to Deposit Account No. 19-4880.

Respectfully submitted,



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Date: May 9, 2001

APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

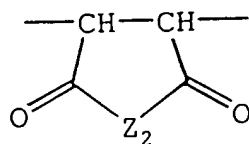
The claims are amended as follows:

1 (amended). A positive photoresist composition for far ultraviolet exposure, comprising:

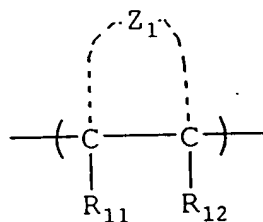
(A) a compound capable of generating an acid by the irradiation of an actinic ray or radiation,

(B) a polymer having at least either a repeating unit represented by the following formula (Ia) or a repeating unit represented by the following formula (Ib) and a repeating unit represented by the following formula (II) and having a group capable of decomposing by the action of an acid, and

(C) a compound capable of decomposing by the action of an acid to generate a sulfonic acid:



(Ib)

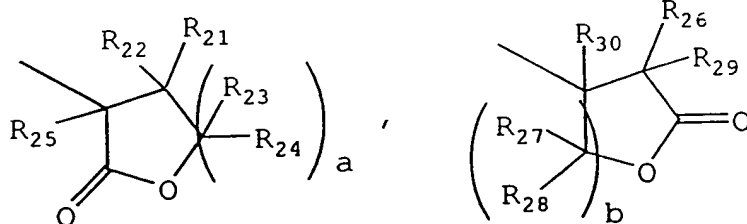


(II)

wherein

in formula (Ia), R_1 and R_2 each independently represents hydrogen atom, a cyano group, a hydroxyl group, $-COOH$, $-COOR_5$, $-CO-NH-R_6$, $-CO-NH-SO_2-R_6$ (wherein R_5 represents an alkyl group which may have a substituent, a cyclic hydrocarbon group which may have a substituent or a $-Y$ group shown below, and R_6 represents an alkyl group which may have a substituent or a cyclic hydrocarbon group which may have a substituent), an alkyl group which may be substituted, an alkoxy group which may be substituted, a cyclic hydrocarbon group which may be substituted or a $-Y$ group shown below, X represents oxygen atom, sulfur atom, $-NH-$, $-NHSO_2-$ or $-NHSO_2NH-$, and A represents a single bond or a divalent linking group:

$-Y$ group:



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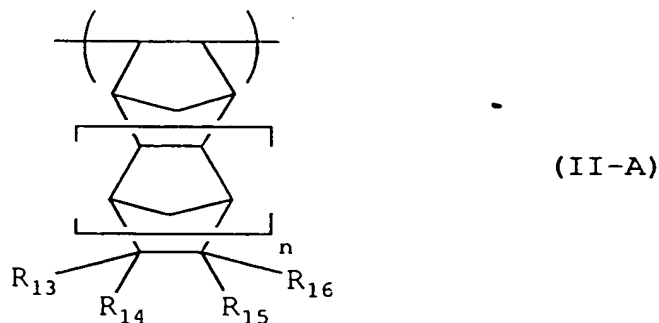
(wherein R_{21} to R_{30} each independently represents hydrogen atom or an alkyl group which may have a substituent, and a and b each represents 1 or 2);

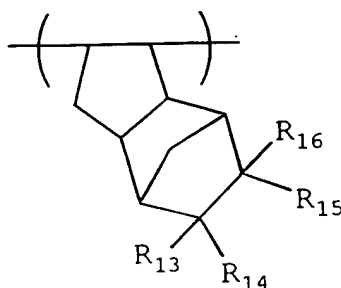
in formula (Ib), Z_2 represents -O- or -N(R_3)- (wherein R_3 represents hydrogen atom, a hydroxyl group or -OSO₂- R_4 (wherein R_4 represents an alkyl group, a haloalkyl group, a cycloalkyl group or a camphor residue)); and

in formula (II), R_{11} and R_{12} each independently represents hydrogen atom, a cyano group, a halogen atom or an alkyl group which may have a substituent, and Z_1 represents an atomic group necessary for forming an alicyclic structure which contains two bonded carbon atoms [(C-C)] and may have a substituent.

2 (amended). The positive photoresist composition for far ultraviolet exposure as claimed in claim 1, wherein Z_1 in formula (II) represents an atomic group necessary for forming a bridged alicyclic structure which contains two bonded carbon atoms [(C-C)] and may have a substituent.

3 (amended). The positive photoresist composition for far ultraviolet exposure as claimed in claim 1, wherein the repeating unit represented by formula (II) is that represented by the following formula (II-A) or (II-B):





(II-B)

wherein R_{13} to R_{16} each independently represents hydrogen atom, a halogen atom, a cyano group, $-\text{COOH}$, $-\text{COOR}_5$ (wherein R_5 is [the same] as defined in claim 1 [above]), a group capable of decomposing by the action of an acid, $-\text{C}(=\text{O})-\text{X}-\text{A}-\text{R}_{17}$ (wherein X and A are [the same] as defined in claim 1 [above], and R_{17} represents $-\text{COOH}$, $-\text{COOR}_5$, $-\text{CN}$, a hydroxyl group, an alkoxy group which may have a substituent, $-\text{CO}-\text{NH}-\text{R}_6$, $-\text{CO}-\text{NH}-\text{SO}_2-\text{R}_6$ (wherein R_5 and R_6 are [the same] as defined in claim 1 [above]) or a $-\text{Y}$ group [shown above] as defined in claim 1), an alkyl group which may have a substituent or a cyclic hydrocarbon group which may have a substituent, at least two of R_{13} to R_{16} may be combined to form a ring, and n represents 0 or 1.

4 (amended). A positive photoresist composition for far ultraviolet exposure, comprising:

(A) a compound capable of generating an acid by the irradiation of an actinic ray or radiation,

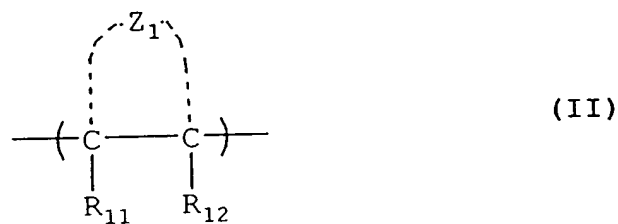
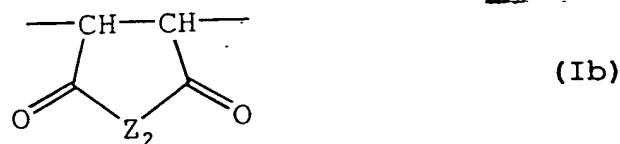
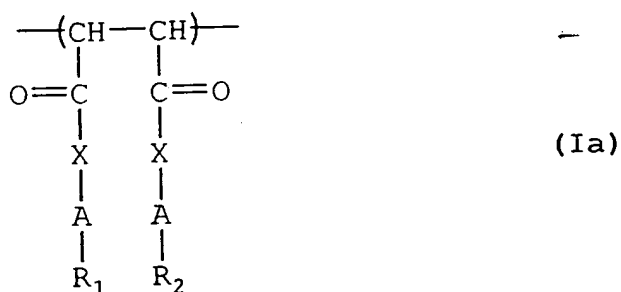
(B) a polymer having at least either a repeating unit represented by the

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following formula (Ia) or a repeating unit represented by the following formula (Ib) and a repeating unit represented by the following formula (II) and having a group capable of decomposing by the action of an acid, and

(D) a fluorine-type and/or silicon-type surface active agent:



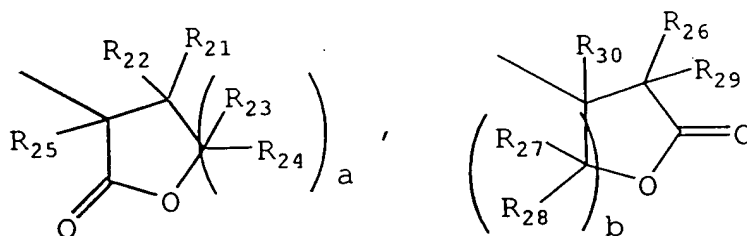
wherein

in formula (Ia), R₁ and R₂ each independently represents hydrogen atom, a cyano group, a hydroxyl group, -COOH, -COOR₅, -CO-NH-R₆, -CO-NH-SO₂-R₆ (wherein R₅ represents an alkyl group which may have a substituent, a cyclic hydrocarbon group which may have a substituent or a -Y group shown below, and

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R₆ represents an alkyl group which may have a substituent or a cyclic hydrocarbon group which may have a substituent), an alkyl group which may be substituted, an alkoxy group which may be substituted, a cyclic hydrocarbon group which may be substituted or a -Y group shown below, X represents oxygen atom, sulfur atom, -NH-, -NHSO₂- or -NHSO₂NH-, and A represents a single bond or a divalent linking group:

-Y group:



(wherein R₂₁ to R₃₀ each independently represents hydrogen atom or an alkyl group which may have a substituent, and a and b each represents 1 or 2) ;

in formula (Ib), Z₂ represents -O- or -N(R₃)- (wherein R₃ represents hydrogen atom, a hydroxyl group or -OSO₂-R₄ (wherein R₄ represents an alkyl group, a haloalkyl group, a cycloalkyl group or a camphor residue)); and

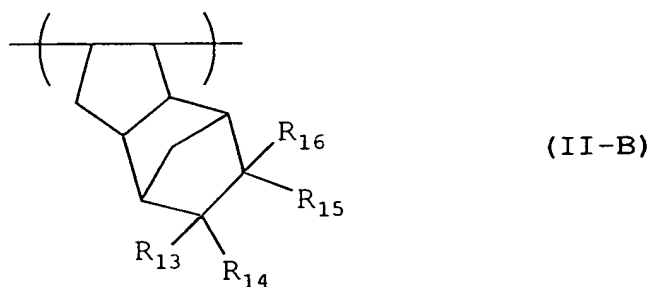
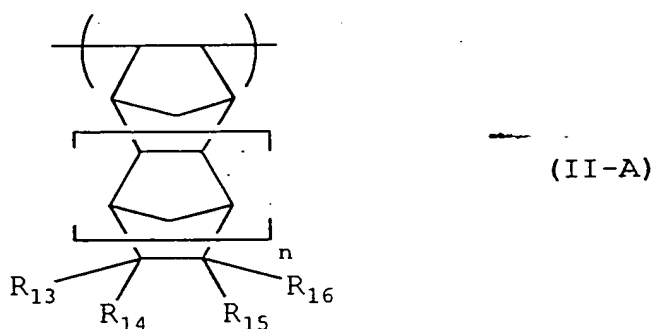
in formula (II), R₁₁ and R₁₂ each independently represents hydrogen atom, a cyano group, a halogen atom or an alkyl group which may have a substituent, and Z₁ represents an atomic group necessary for forming an alicyclic structure which contains two bonded carbon atoms (C-C) and may have a substituent.

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5 (amended). The positive photoresist composition for far ultraviolet exposure as claimed in claim 4, wherein Z_1 in formula (II) represents an atomic group necessary for forming a bridged alicyclic structure which contains two bonded carbon atoms $[(C-C)]$ and may have a substituent.

6 (amended). The positive photoresist composition for far ultraviolet exposure as claimed in claim 4, wherein the repeating unit represented by formula (II) is that represented by the following formula (II-A) or (II-B):



wherein R_{13} to R_{16} each independently represents hydrogen atom, a halogen atom, a cyano group, $-COOH$, $-COOR_5$ (wherein R_5 is [the same] as defined in claim 4 [above]), a group capable of decomposing by the action of an acid, $-C(=O)-X-A-R_{17}$ (wherein X and A are [the same] as defined in claim 4 [above], and R_{17} represents $-COOR$, $-COOR_5$, $-CN$, a hydroxyl group, an alkoxy group which may have a

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substituent, -CO-NH-R₆, -CO-NH-SO₂R₆ (wherein R₅ and R₆ are [the same] as defined in claim 4 [above]) or a -Y group [shown above] as defined in claim 4), an alkyl group which may have a substituent or a cyclic hydrocarbon group which may have a substituent, at least two of R₁₃ to R₁₆ may be combined to form a ring, and n represents 0 or 1.

9 (amended). A positive photoresist composition for far ultraviolet exposure, comprising:

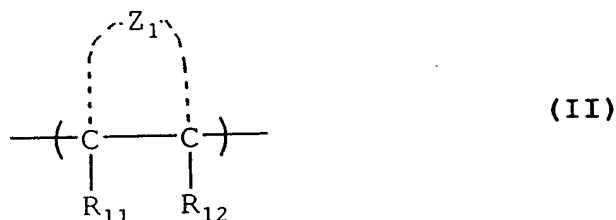
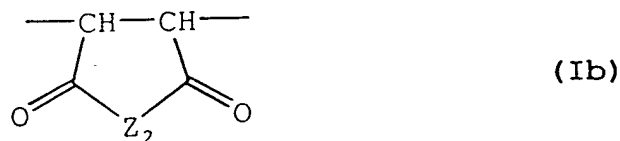
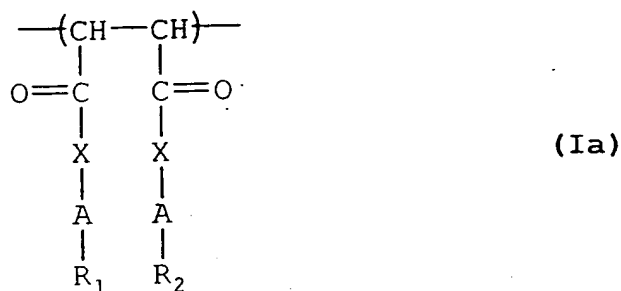
(A) a compound capable of generating an acid by the irradiation of an actinic ray or radiation,

(B) a polymer having at least either a repeating unit represented by the following formula (Ia) or a repeating unit represented by the following formula (Ib) and a repeating unit represented by the following formula (II) and having a group capable of decomposing by the action of an acid, and

(E) a mixed solvent containing at least one selected from the group consisting of butyl acetate and propylene glycol monoalkyl ether carboxylate and at least one selected from the group consisting of ethyl lactate and propylene glycol monoalkyl ether:

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wherein

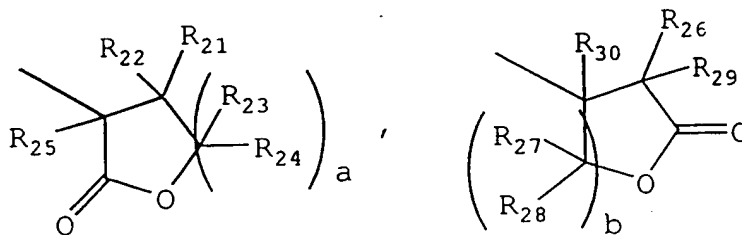
in formula (Ia), R_1 and R_2 each independently represents hydrogen atom, a cyano group, a hydroxyl group, $-\text{COOH}$, $-\text{COOR}_5$, $-\text{CO-NH-R}_6$, $-\text{CO-NH-SO}_2\text{-R}_6$ (wherein R_5 represents an alkyl group which may have a substituent, a cyclic hydrocarbon group which may have a substituent or a $-\text{Y}$ group shown below, and R_6 represents an alkyl group which may have a substituent or a cyclic hydrocarbon group which may have a substituent), an alkyl group which may be substituted, an alkoxy group which may be substituted, a cyclic hydrocarbon group which may be substituted or a $-\text{Y}$ group shown below, X represents oxygen atom, sulfur atom, -

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NH-, -NHSO₂- or -NHSO₂NH-, and A represents a single bond or a divalent linking group:

-Y group:



(wherein R₂₁ to R₃₀ each independently represents hydrogen atom or an alkyl group which may have a substituent, and a and b each represents 1 or 2);

in formula (Ib), Z₂ represents -O- or -N(R₃)- (wherein R₃ represents hydrogen atom, a hydroxyl group or -OSO₂-R₄ (wherein R₄ represents an alkyl group, a haloalkyl group, a cycloalkyl group or a camphor residue)); and

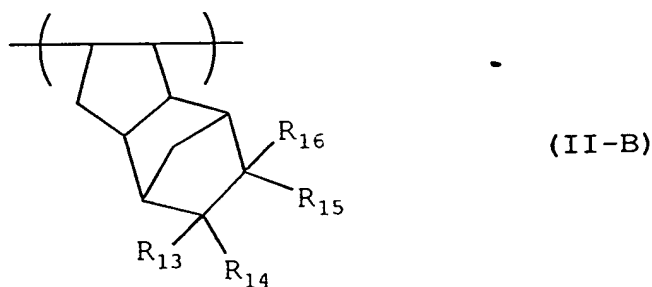
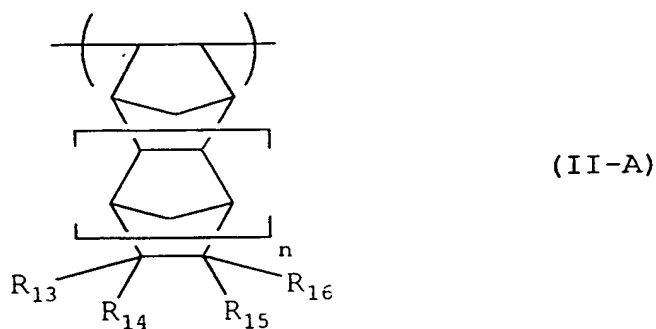
in formula (II), R₁₁ and R₁₂ each independently represents hydrogen atom, a cyano group, a halogen atom or an alkyl group which may have a substituent, and Z₁ represents an atomic group necessary for forming an alicyclic structure which contains the two bonded carbon atoms [(C-C)] and may have a substituent.

10 (amended). The positive photoresist composition for far ultraviolet exposure as claimed in claim 9, wherein Z₁ in formula (II) represent an atomic group necessary for forming a bridged alicyclic structure which contains two bonded carbon atoms [(C-C)] and may have a substituent.

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11 (amended). The positive photoresist composition for far ultraviolet exposure as claimed in claim 9, wherein the repeating unit represented by formula (II) is that represented by the following formula (II-A) or (II-B):



wherein R_{13} to R_{16} each independently represents hydrogen atom, a halogen atom, a cyano group, $-\text{COOH}$, $-\text{COOR}_5$ (wherein R_5 is [the same] as defined in claim 9 [above]), a group capable of decomposing by the action of an acid, $-\text{C}(=\text{O})-\text{X}-\text{A}-\text{R}_{17}$ (wherein X and A are [the same] as defined in claim 9 [above], and R_{17} represents $-\text{COOH}$, $-\text{COOR}_5$, $-\text{CN}$, a hydroxyl group, an alkoxy group which may have a substituent, $-\text{CO}-\text{NH}-\text{R}_6$, $-\text{CO}-\text{NH}-\text{SO}_2-\text{R}_6$ (wherein R_5 and R_6 are [the same] as

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defined in claim 1 [above]) or a -Y group [shown above] as defined in claim 9), an alkyl group which may have a substituent or a cyclic hydrocarbon group which may have a substituent, at least two of R_{13} to R_{16} may be combined to form a ring, and n represents 0 or 1.